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Operation Hurricane

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British scientists had been heavily involved in the US wartime Manhattan Project to develop a nuclear weapon. After the war, the United States, keen to maintain its monopoly of A-bomb weaponry and concerned about intelligence leaks, ended all nuclear co-operation with the British. As a consequence the Labour government authorised the development of a British bomb using the scientists that had been involved in the wartime research.

One aim of building a British bomb was to maintain the United Kingdom’s influence in the world: a world in which the United States had the only such arsenal and the Soviet Union controlled most of Eastern Europe with the continent’s largest army.

The explosion of the first Soviet bomb in 1949 seemed to justify the decision by the British to develop such a weapon. Three years later, the British detonated their first bomb in ‘Operation Hurricane’ on the Australian island of Trimoulle, part of the Monte Bello island group.

The warhead, exploded from the old British frigate HMS Plym, used British and Canadian plutonium. This was later developed into the ‘Blue Danube’ weapon carried on the active British nuclear force of RAF ‘V-bombers’.

The decision to use the Monte Bellos as a test site, the treatment of aborigines in the area and compensation for those involved in the tests was explored by an Australian Royal Commission in 1986 [these records can be found in AB 40 in The National Archives’ catalogue].

This film highlights the technological achievements of the group of British and émigré scientists involved.

Transcription

It began on the rolling weald of Kent.
The Montebello bomb was designed and most of it was made in this quiet unsuspecting countryside. Behind that screen of trees is Fort Halstead, built for defence against a French invasion, now used for research into new weapons and new explosives. The

guard on patrol, the check at the gate are not mere routine.
This was the headquarters of the man who designed the bomb, Sir William Penney – the only British scientist at the bombing of Nagasaki. Britain's leading atomic scientists were then working in partnership with the Americans. But after 1945 they had to work alone, starting afresh with basic calculations to determine the critical mass necessary to produce a chain reaction – calculations abstruse and complex, beyond the convenient compass of the human mind.
What the cells of an electronic brain will solve in a day will take a mathematician a year to work out.

The Montebello bomb and all the equipment for this experiment were made in British workshops by British workmen.

Accurate to 1/10,000 of an inch – that was the precision demanded and achieved – both for the bomb and for the instruments to measure its performance. At Fort Halstead they made 2 high-speed cameras taking pictures at the rate of 100,000 in one second. With these cameras the scientists could reconstruct the pattern of the explosion in the first revealing fraction of a second.

In concept and design, this camera was entirely British, and design became reality in the hands of fine craftsmen.

At every stage, check and double-check.

Instruments too for testing the impact of the explosion, for measuring heat, blast and radiation, for gauging the instant shaft of gamma ray and the lingering poison of radioactivity – all these designed and produced at Halstead, Harwell and other Atomic Energy Establishments.

This electronic equipment will carry the circuit to actuate the firing mechanism in the bomb itself.
Here, the designers' demands reach the peak of precision – an accuracy of 1/1,000,000 of a second. Nothing was left to chance, but there was still an element of doubt.
No one could yet tell for certain how the bomb would perform when the testing time came. Many minds and many hands were to turn to the making of this atomic weapon, but only half a dozen knew the whole secret of the bomb's design.
They knew they were making a weapon of awe-inspiring power, but they would never see the finished product, never even know, perhaps, the ultimate function of the parts that they handled with such care.

At Chatham in June 1952 the escort carrier Campania prepares to sale for Western Australia as flagship of the special squadron. Campania once escorted northern convoys carrying supplies to an allied Russia. With Campania is HMS Tracker, a landing ship carrying some of the more precious equipment, like this gleaming caravan that houses one of the high-speed cameras.

From the broad and busy Thames estuary HMS Tracker sets out alone for the remote and barren Montebello Island, lying some 60 miles off the north-west coast of Australia.

At Montebello the advance party is already at work. 200 Royal Engineers had arrived in April to find an empty wilderness of salt, bush and spinifex. Parched and stunted, it readily burnt to make way for installations and equipment. And every installation and every instrument has to be placed by survey in relation to Ground Zero, the planned point of the explosion. Control points and test buildings rise from the wasteland but the only local materials are sand and rock for making concrete. There wasn't even a jetty until this one was built by an Airfield Construction Unit of the Australian Air Force.

No roads either on this trackless yards, and the task of building them was arduous and slow. Within the danger zone they erected the familiar Anderson shelters, well-protected by sandbags, and there too they built concrete structures of varying sizes and strengths to test the impact of blast and the penetration of gamma ray. These tests would influence the pattern of civil defence against some future atomic attack. This was one of the problems Montebello would help to decide.

From Montebello back to Portsmouth. There, within site of Nelson's Victory, Campania takes on the rest of her cargo – a brood of boffins: physicists and mathematicians, chemists and botanists, doctors and engineers – each with a positive role to play in this great experiment.

From Portsmouth on June 10th, Campania sets out on her long voyage. Campania wore the flag of Rear Admiral Paulus, Admiral special squadron, the man responsible for the expedition's transport, maintenance and safety. But the Navy has a special interest in this operation. It's intended to reveal the effects of exploding an atom bomb in the hold of the ship in the confines of a harbour – a harbour like Portsmouth.

At sea the weeks pass slowly on the tedious journey around the Cape of Good Hope. Campania was escorted by HMS Plym. Now she is sailing on her last mission for Plym is the target vessel, already carrying the bomb in her hold.

In mid-ocean on Campania's flight deck, officers are trained to guard against the hazards of radiation, to detect it with Geiger counters and electroscopes. That box contains radioactive material giving off radiations which sound like static in the headphones of the Geiger counters. From this crackling the wearer can tell if the dose became dangerous.

Campania carries three Dragonfly helicopters for rescue, communications and in due course for the hazardous task of flying over the target area soon after the explosion and of lifting samples of radioactive water from the poisoned lagoon.

Landfall at last: Fremantle, Western Australia.

Here the squadron replenishes its stores and is joined by the units of the Australian Navy, including the Hawkesbury, a sister ship to HMS Plymouth.

All told, there will be 10 Australian warships on security patrol around the Montebellos.

The Squadron arrive on August the 8th, two months out from Portsmouth, two months before D-Day.

And HMS Plym comes to the end of her final voyage in the Montebello lagoon.

Next morning a party of scientists leaves Campania to explore their island's laboratory for the first time, to check the sites for equipment that will record the effects of the explosion.

In their wake comes the equipment itself, taken ashore in landing craft manned by a Royal Marine.

Stores and equipment go in that. Some by lorry, some by sledge and tractor, for much of the island is treacherous sand. With the aid of bulldozers, some instruments are sunk in the sand as protection against the blast. Others stand in the open to measure the blast itself. One gauge is simply made of empty toothpaste tubes, but most of them will relay their readings electrically by landlines that link them to blast recorders, safe below the level of the ground.

It takes hundreds of miles of wire to complete the elaborate network of gauges and recorders, extending throughout the islands that surround the lagoon.

Other cables go under water to control headquarters on another island so the recording instruments can be set in action at the last minute.

Similar cables running from HMS Plym will carry the electrical circuit to fire the weapon by remote control.

And when it's fired, these aerials will bring to control headquarters the readings from instruments within the target zone.

The high-speed cameras reach their destination. They have taken months to build, weeks to move, days to site, but their task would be done in a thousandth part of a second.

And now to HMS Tracker, the health ship, the medical headquarters responsible for safeguarding the force against the hazards of radiation.

Before D-Day thorough rehearsals for all those who have to re-enter the target area after the explosion. In the health ship they collect special protective clothing and special devices to record the amount of radiation absorbed – these precautions for every journey into a contaminated zone – so great is the danger from radiation. Every man has to strip and change. They put on fine woollen underclothes, clad in overalls; sweat rags, rubber gloves and Wellington boots.

By the end of September all preparations are completed, but the operation has to wait till the weather and wind are right.

Meanwhile there is a moment for relaxation.

This is their last chance to fish. After the explosion all fishing will be banned because of the danger of contamination.

October the 2nd and D-Day will be tomorrow if the weather is right.

On shore, these instruments stand like sentinels waiting to measure the blast of the shock wave. Their measurements will be relayed by line to this recording machine that's now being tested, set and wound, ready for tomorrow.

The last sartorial touches are given to those uniformed dummies that will test the effects of thermal radiation on normal service dress.

Rocket projectors are loaded and primed, ready to fire through the deadly cloud rising from the target. These rockets will record the radiation in the air and reveal to the scientists how accurate their calculations were, how complete the chain reaction was.

A final check on the Anderson shelters.

And on top one of the reinforced concrete buildings a scientist sets a shadow graph to record the exact point of the explosion.

Boxes of vegetables, sweet corn, lettuce, tomatoes, melons, cucumbers and beans – all grown at sea and now set out ashore to discover how much poison it will absorb from the radioactive air. Foodstuffs of all kinds await tomorrow's experiment: butter, tea, tinned meat, sacks of flour, some open to the air, some packed in boxes or cartons or tins, to test the value of various containers as protection against contamination.

Here, technicians make their final adjustments to the gamma flux meters, designed to measure the radiation and transmit their findings by landline and then by radio to the control post and the health ship.

The stage is set. Technicians, scientists and soldiers all depart from the islands around the lagoon. They are bound for the special squadron, now about to leave for a safe anchorage some distance from tomorrow's target zone.

All this time the waters round the Montebello are patrolled by the Royal Australian Navy.

From the mainland at Broome, Lincoln bombers of the Royal Australian Air Force take off to reinforce the security patrol above and beyond the Montebello, ranging far and wide over the Indian Ocean.

Fine enough here, but the wind is from the wrong quarter and it is too stiff for the easy handling of the small craft.

But what's the forecast for tomorrow?

200 miles inland, at Roy Hill's station, an Australian meteorologist seeks the answer. The weather and especially the wind must be right, lest the radioactive cloud be carried to the mainland.

Weather reports from Broome, weather reports from Onslow are beamed to Campania. There the forecasters examine the reports and charts. The essential conditions are a calm sea, a southerly wind and no risk of a sudden change.

In Campania's ward room Admiral Paulus and Dr Penney are waiting for the answer. They've been hanging on the weather for 24 hours already, but the forecasters now see a fairer prospect for the morrow. In the ward room they report that conditions will be perfectly safe and Dr Penney gives the order for the weapon to be fired at 8 o'clock next morning.

Inside the secret bowels of Plym one scientist remains to arm the firing circuit.

Connect the batteries – 1 . 2

Next the switches: 1, 2, 3.

Now the key, turning the circuits into a position to fire.

That's it.

The weapon is ready to explode at the touch of control headquarters on an island some miles away, but it can't be fired before this man gets there since he carries that safety link and without that link the firing circuit is still open.

Inside headquarters the rest of the control party are waiting at their instruments. In the half-light of the control room the safety link is delivered to the controller. The final process of firing can now be set in train.

"Time bracket – open."

"Ox George this is Howell 1. How's your message? Over."

"Hello Howell 1. This is Ox George. A Saturn completed. Over." "Understand A Saturn completed. Out."

"Right. You can put the safety key in now."

Safety link in. Circuit complete.

"Can we have the all-ready signals, please?

Mr Abercrombie, please. Thank you.

Minus 8 and a half minutes.

Minus 7 minutes.

Minus 6 minutes.

Minus 5 minutes.

Minus 4 minutes.

Take the bolts out.

Minus 3 minutes.

Minus 2 minutes.

Minus 1 and a half minutes.

Minus 55 seconds.

25.

10.

5,4,3,2,1. Now.

[Roar of explosion. Silence.]

The cloud drifts well clear of the mainland but it's still highly-charged with dangerously radioactive water and mud. Yet very soon 2 helicopters are taking off to bring back samples of the sea water from the lagoon.

Aboard HMS Tracker, the health ship, the aerials are alive with signals from the island. Coming by telemetry from the gamma flux meters, telling the volume and extent of radiation.

The readings appear on a radarscope and as they come in, each one is plotted against a map of the island, building up the dread pattern of contamination that will linger for weeks and months.

Every reading is carefully logged, for this information is of vital importance to military and civil defence.

Tracker sails uneasily and cautiously towards the contaminated waters.

From the lagoon, the helicopters return carrying their dangerous samples at a safe distance to be neatly dropped on the deck of the landing ship Zeebrugge.

Meanwhile from Tracker, survey boats set out on patrol to find and chart the limits of contamination in the island waters before anyone can dare approach the shore.

In due course recovery teams land on the stricken beach.

On shore, they find many of the Anderson shelters have survived the ordeal remarkably well – better than some of the concrete-block houses.

This electronic recorder had registered and transmitted its vital message in the first millionth of a second, after the bomb burst, and before the blast destroyed its housing.

Back on the health ship, the recovery teams turn in their equipment to be checked and monitored. They report that the Montebellos are still hot, still dangerously radioactive, from the fission products? Spread by the bursting bomb – the bomb that produced this fearsome explosion.

That lethal cloud rising above Montebello marks the achievement of British science and industry in the development of atomic power, but it leaves unanswered the question of how shall this new-found power be used – for good or evil, for peace or war, for progress or destruction. The answer doesn't lie with Britain alone, but we may have a greater voice in this great decision if we have the strength to defend ourselves and to deter aggression.

That was the meaning of Montebello.

Tags

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